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CLAIMS 1-14. (CANCELLED)

9. ~~15.~~ (Amended) A process for making a semiconductor device according to claim ~~28~~, wherein the forming of the barrier film comprises the following substeps:

vapor depositing a metal halide on the cleaned heated substrate surface at a temperature of 500 to 700°C, in a vacuum having a background pressure of less than approximately 10^{-12} Torr, and wherein the metal halide deposition is conducted at a rate permitting the metal halide vapor to react with the substrate surface to form a monolayer of metal atoms selected from barium atoms, strontium atoms, and cesium atoms, singly or in combinations thereof, on said surface of said substrate; and

continuing, after forming the monolayer, the vapor depositing of the metal halide to form a metal halide layer regime upon the monolayer until the desired barrier film thickness has been achieved.

~~10.16.~~ (Amended) A process of making a semiconductor device according to claim ~~25~~¹, wherein the forming of the single crystal transition metal on the barrier film comprises depositing a transition metal on the barrier film concurrent with heating the substrate and barrier film surface to a temperature effective to cause the transition metal to assume a monocrystalline structure.

~~11.17.~~ (Amended) A process for making a semiconductor device according to claim ~~29~~¹, wherein the forming of the single crystal transition metal on the barrier film comprises the substeps of depositing a transition metal on the barrier film at a temperature below which the metal forms with a single crystal structure, and then annealing the resulting metallized substrate at a temperature effective to cause the transition metal to assume a monocrystalline structure.

~~12.~~
~~18.~~ (Twice amended) A process for making a semiconductor device according to claim ~~29~~¹, wherein the forming of the single crystal transition metal on the barrier film comprises depositing a transition metal on the barrier film concurrent with heating the substrate and barrier film surface to approximately 375°C or higher.

~~13.~~¹² ~~19.~~ A process for making a semiconductor device according to claim ~~18~~¹², wherein the transition metal comprises copper.

~~14.~~¹ ~~20.~~ (Twice amended) A process for making a semiconductor device according to claim ~~29~~¹, wherein the forming of the single crystal transition metal on the barrier film comprises the substeps of depositing a transition metal on the barrier film at a temperature below 375°C, and then annealing the resulting metallized substrate at a temperature of 375°C or higher.

~~5.21.~~¹⁴ A process for making a semiconductor device according to claim ~~20~~¹⁴, wherein the transition metal comprises copper.

CLAIMS 22-28. (CANCELLED)

~~1.29.~~ (Amended) A process of making a semiconductor device comprising the steps of: forming, on a surface of a substrate material, a barrier film comprising a monolayer of metal atoms, said metal atoms being selected from the group consisting of barium, strontium, and cesium atoms, singly or in combinations thereof; and forming a single crystal transition metal on the barrier film.

~~2.30.~~¹ (Amended) A process for making a semiconductor film according to claim ~~29~~¹, wherein the barrier film comprises a heteroepitaxial film structure comprising the monolayer of metal atoms located on said surface of said substrate, and a homoepitaxial portion comprised of a metal halide selected from barium halide, strontium halide, and cesium halide, located between the monolayer and the transition metal.

3. ~~31~~.² (Amended) A process for making a semiconductor device according to claim ~~30~~², wherein the homoepitaxial portion of the barrier film is comprised of a metal halide selected from the group consisting of BaF₂, BaCl₂, SrF₂, SrCl₂, CsF, and CsCl.

4. ~~32~~. (New) A process for making a semiconductor device according to claim ~~29~~¹, wherein the barrier film has a thickness of less than 100Å.

5. ~~33~~. (New) A process for making a semiconductor device according to claim ~~29~~¹, wherein the barrier film has a thickness ranging from approximately 20Å to approximately 75Å.

6. ~~34~~. (New) A process for making a semiconductor device according to claim ~~29~~¹, wherein the transition metal is selected from the group consisting of copper, silver, gold and platinum.

7. ~~25~~. (New) A process for making a semiconductor device according to claim ~~25~~¹, wherein the transition metal comprises copper.

8. ~~26~~. (New) A process for making a semiconductor device according to claim ~~26~~¹, wherein the substrate material comprises a semiconductor.